DIRECTED ENERGY PROFESSIONAL SOCIETY

Technical Program

Eleventh Annual Directed Energy Symposium

CO-SPONSORED BY
NAVAL SEA SYSTEMS COMMAND

17 - 21 November 2008
Honolulu, Hawaii

Directed Energy Education Workshop

SPONSORED BY HEL JTO

21 November 2008
Honolulu, Hawaii

O - OPEN **L - LIMITED** **S - SECRET**

Locations of Symposium Events

Most Symposium sessions will be held at the Sheraton Hotel in rooms that are identified in the program. Exceptions include these:
Reception Wednesday evening: USS Missouri
Secret Sessions: Offsite Location

Transportation

Limited bus transportation will be provided to SECRET sessions. The Offsite Location is a short 10 minute walk from the Sheraton Waikiki. A map is available in your registration packet. Buses will start at 0700 and run as late as required. On Wednesday morning, buses will start at 0620. Buses will run from the Sheraton Waikiki to the Offsite Location and will shuttle between these locations continually every 20 minutes. (on the hour, 20, & 40) Do not bring cell phones, pagers, writing materials, or bags to the Offsite sessions from the Sheraton.

Bus transportation will be provided for all attendees from the Sheraton to the USS Missouri on Wednesday evening for the reception. The last bus to the reception leaves at 1800. You may not bring bags to the USS Missouri.

Breakfasts

Breakfast will be served Tuesday - Friday at the Sheraton Hotel.

Lunches

Lunch will be served Tuesday - Thursday at the Sheraton and Wednesday - Thursday at the Offsite Location. Symposium attendees may eat at either location. Limited coffee and snacks during breaks will be available at both locations.

Directed Energy Education Workshop

The DE Education Workshop is a separate event from the Symposium, scheduled for Friday 21 November at the Sheraton. Any Symposium registrant may attend the Workshop.

AUDIO AND VIDEO RECORDING IS PROHIBITED AT ALL DEPS SPONSORED EVENTS

MONDAY

Short Courses

0700 **Registration at Sheraton**

0800 **Short Courses Begin**

1. **Introduction to High Energy Laser Systems**
   Sheraton, Honolulu Room
2. **Introduction to High Power Microwave Systems - Sheraton, Kahuka Room**
3. **Introduction to Laser Beam Quality**
   Sheraton, Oahu Room
4. **Introduction to Applications of HEL (Limited)**
   Sheraton, Wailua Room
5. **Bio-Effects (SECRET)**
   Sheraton, Waianae Room
6. **Free Electron Lasers** - FULL DAY COURSE
   Sheraton, Waimea Canyon Room
7. **Fiber Lasers** - FULL DAY COURSE
   Sheraton, Koko Crater Room

1200 **Break for Lunch**

1230 **Golf Tournament Ko'olau Golf Course**

1300 **Afternoon Short Courses Begin and Full Day Courses Resume**

8. **Transitioning DE Technology to the Warfighter (Limited)**
   Sheraton, Honolulu Room
9. **RF Directed Energy Effects (Limited)**
   Sheraton, Kahuka Room
10. **Test and Evaluation of High Energy Lasers (Limited)**
    Sheraton, Oahu Room
11. **Active Denial Applications (SECRET)**
    Sheraton, Wailua Room

TUESDAY MORNING

Plenary Session (OPEN)

Sheraton, Kauai Room

0700 **Registration at Sheraton**
Breakfast-Hosted by Northrop Grumman

0800 **Call to Order**

0810 **Welcome**
CAPT David Kiel, U.S. Navy, Chair of the Symposium

0820 **DEPS Welcome**
Dr. William Baker, DEPS

0825 **Keynote Speaker**
The PACOM Perspective
RADM Charles W. Martoglio, U.S.Navy, United States Pacific Command

0905 **The Air Force Perspective**
Maj Gen Mike Hostage III, U.S. Air Force, Pacific Air Forces Command

0940 **Break**

1005 **Industry's Perspective for Creating Innovation in Military Weapon Systems**
Mr. Barry Schuler, Raydiance, Inc.

1040 **The Department of Homeland Security Perspective**
Mr. Randel L. Zeller, Department of Homeland Security

1120 **Army Science and Technology Overview**
Mr. Matt Donohue, Office of the Deputy Assistant Secretary of the Army for Research and Technology

1155 **DEPS Annual Report**
Dr. William Baker, DEPS

1215 **Lunch**

Technology to Transition (OPEN)

Sheraton, Kauai Room

1300 **Near-Term DE Transitions to the Warfighter - A Critical Need for Transitioning DE**
Howard Meyer, OUSD (AT&L)

1320 **Highlights and Recommendations from the DE "Quick Look" Study to Weaponize DE**
Douglas Beason, Los Alamos National Lab

1340 **Technical Issues Concerning HEL Deployment**
Martin Stickley, Booz, Allen, Hamilton

1400 **JTO HEL Program Overview**
Mark Neice, Joint Technology Office

1420 **Tri-Service Study Update Project**
Mike Bertin, SAIC

1440 **Break**

HEL Interaction and Diagnostics (OPEN)

1500 **High Energy Laser Ground Target Irradiance Measurement Capability**
Mike Bertin, SAIC

1520 **The Feasibility of Using Remote Imagery for High Energy Laser Irradiance-On Target Measurements**
Larry McKee, SAIC

1540 **1.07 um Irradiation of Carbon-Loaded Polymeric Materials**
Christopher Lloyd, Naval Research Lab

1600 **Temperature Determination of Laser-Heated Target Surfaces is Multiband Pyrometry Accurate**
James Griggs, SAIC

1620 **Intense Laser Acoustic Source Characterization and Nonlinear Underwater Optics Studies**
Ted Jones, Naval Research Lab

1640 **Comprehensive 3-D Simulation of Multiple Laser Beams Interaction with Various Targets in DE Response**
Ahmed Hassanein, Purdue University

1730 **Poster Sessions at Sheraton Evening Reception**

Student Session (OPEN)

Sheraton, Oahu Room

1300 **Opening Remarks**
Don Seeley, HEL JTO, Chair

1310 **Laser Induced Breakdown Spectroscopy of Surrogate Explosives**
Leebyn Chong, Naval Research Lab

1335 **Passive Shear Layer Regularization for Aero-Optics: A Progress Report**
Donald Wittich III, Notre Dame

1400 **Image Based BRDF Acquisition**
Phillip Grice, Air Force Institute of Technology

1425 **Analysis of Multiple Laser Beam Wander in a 2-mile Propagation Experiment**
Amanda Fried, Naval Research Lab

1450 **Break**

1510 **Filament Measurements in Underwater Laser Propagation**
Julie Haney, Naval Research Lab

1535 **Z-scan Measurement of the Upconversion Coefficient in Er:YAG**
Robert Dibiano, Army Research Lab

1600 **Diode Laser Pump Source for Sodium Vapor Laser**
R. Cwynar, Air Force Academy

1625 **Generation of Blue 447 nm Laser Light by Frequency Doubling of Cs Vapor Laser**
D. Wright, Air Force Academy

1650 **Measurement of the Rb Fine Structure Mixing with Helium**
G. Jemo, Air Force Academy

1730 **Poster Sessions at Sheraton Evening Reception**

TUESDAY AFTERNOON

FEL Components, Systems, and Novel Concepts I (OPEN)

Sheraton, Honolulu Room

1500 **Undulator Technology for High Power Free Electron Lasers**
Stephen Gottschalk, STI Optronics

1520 **Advanced Longitudinal Diagnostics for SAFE FELs at the VISA and SPARC Facilities**
Gerard Andonian, UCLA

1540 **Laser Seeded FEL Amplifier R&D for MW-Class FEL Applications**
Jim Murphy, Science Applications International Corp

1600 **Exploring Intense Electron Beam Physics on the University of MD Electron Ring**
Patrick O'Shea, University of Maryland

1620 **Ion Problem in Free Electron Lasers**
Keith Cohn, Stanford University

1730 **Poster Sessions at Sheraton Evening Reception**

TUESDAY AFTERNOON

DE Technology Programs (LIMITED)

Sheraton, Lanai Room

1500 **Joint High Power Solid State Laser Progress at Northrop Grumman**
Jay Marmo, Northrop Grumman

1520 **Status of Textron's J-HPSSL 100kW ThinZag laser Program**
Daniel Trainor, Textron Defense Systems

1540 **A Technology Transfer Case Study: The Enhanced Track Illuminator for the Airborne Laser Program**
Olivia Koski, Lockheed Martin

1600 **DE Integration Options Overview**
Keith Coleman, Boeing

1620 **Ground-Based Counter Measure with Asymmetric Warfare Applications**
Chad Smith, General Dynamics

1730 **Poster Sessions at Sheraton Evening Reception**

TUESDAY AFTERNOON

HPM Systems and Laser Induced Plasma Channel (SECRET)

Offsite Location

1240 **Buses to Offsite Location**

1300 **Field Test of the MEGA (Microwave Electronic Ground Attack) Prototype Combat Vehicle**

1320 **Evaluation of a Unique High Power, Wideband RF System**

1340 **Simulation of the Evolution of Laser-Guided Discharge Channels**

1400 **Scaling of Laser Guided Energy to Extended Ranges**

1420 **Laser Induced Plasma Channel (LIPC) Discharge Target Effects Summary**

HPM Sources, Protection, and Diagnostics (SECRET)

1500 **Enhancing the Communication/Radar Electronic Attack Planning Effectiveness Reference with Radio Frequency Directed Energy Effects**

1520 **Real-Time Adaptive High Power Microwave Generator**

1540 **Advances in Passive HPM Detection and Active Shielding**

1600 **Electromagnetic Hardening of Composite Materials**

1620 **RF Emissions for Weapons**

1640 **Main Beam Power Determination From Interference Patterns**

1730 **Poster Sessions at Sheraton Evening Reception**

Solid State Slab (OPEN)

Sheraton, Kauai Room

0600 **Registration at Sheraton**
Breakfast-Hosted by Northrop Grumman

0800 **Beam Quality Considerations in High Average Power Solid-State Lasers**
Paul Pax, LBNL

0820 **Advanced Transparent Ceramics for High Average Power Solid-State Lasers**
Thomas Soules, LBNL

0840 **New Concept High Power Solid State Laser System**
Kenji Takeshita, Mitsubishi Heavy Industries, Ltd - Japan

0900 **Yb:Y2O3 Ceramic Lasers**
Ishwar Aggarwal, Naval Research Lab

0920 **Reasonantly-Pumped Ceramic Er:Sc2O3 Cryogenic Laser Performance**
Larry Merkle, Army Research Lab

0940 **Break - Hosted by Raytheon**

Optical Components (OPEN)

1000 **Increased HEL Range W/O Off-Axis Mirror Detection from Scatter**
A. Danielson, Bennett Optical Research

1020 **3D Dielectric Meta-Optics for Next-Generation Laser Systems**
Eric Johnson, University of North Carolina

1040 **Impact of Process Parameters and Stack Geometry on the Optical and Structural Properties of SiO2/HfO2 Multilayers**
Carmen Menoni, CSU

1100 **Spinel as Exit Aperture Window for HEL Systems**
Ishwar Aggarwal, Naval Research Lab

1120 **Epoxy Free Bonding for High Performance Lasers**
Nick Traggis, Precision Photonics Corp

1140 **A 2" Voice-Coil Actuated Fast Steering Mirror**
Martin Smith, ATA

1200 **Lunch - Hosted by Raytheon**

WEDNESDAY MORNING

FEL Injectors I (OPEN)

Sheraton, Honolulu Room

0600 **Registration at Sheraton**
Breakfast-Hosted by Northrop Grumman

0800 **Development of Diamond Field-Emitter Arrays for Free-Electron Lasers**
Jonathan Jarvis, Jacobs Technology

0820 **Progress Towards a Robust, Efficient Dispenser Photocathode**
Eric Montgomery, IPG Photonics

0840 **Progress on the High-Current Superconducting Injector and Energy Recovery Linac at BNL**
Ilan Ben-Zvi, Brookhaven National Lab

0900 **Semiconductor Photoemission Theory and its Application**
Kevin Jensen, Naval Research Laboratory

0920 **Semiconductor Photoemission and Dark Current Modeling in the MICHELLE Code**
John Petillo, SAIC

0940 **Break - Hosted by Raytheon**

FEL Injectors II (OPEN)

1000 **Electron Source Development for the LANL Normal Conducting RF Photoinjector**
Nathan Moody, Los Alamos National Lab

1020 **Commissioning of the LCLS Linac and Bunch Compressors**
John Galayda, Stanford Linear Accelerator Center

1040 **Photoemission Images of Prospective Photocathodes**
Jonathon Shaw, Naval Research Lab

1100 **Diamond Current Amplifier Development for FEL Photocathodes**
Joan Yater, Naval Research Lab

1120 **Engineering Design and Fabrication of an Ampere-Class Superconducting Photocathode Electron Gun**
Thomas Schultheiss, Advanced Energy Systems

1140 **Short Pulse High Power Fiber Lasers for Photoinjection**
Pratheepan Madasamy, Aculight Corp

1200 **Lunch - Hosted by Raytheon**

Gas Lasers (LIMITED)

Sheraton, Oahu Room

1000 **Rubidium and Potassium Alkali Vapor Lasers**
Jason Zweiback, WFK Lasers, LLC

1020 **Path Toward a Power-Scaled Hydrocarbon-Free 795-nm Rubidium Laser**
Sheldon Wu, Lawrence Berkeley National Lab

1040 **Review of Alkali Laser Research at the US Air Force Academy**
B. Zhdanov, US Air Force Academy

1200 **Lunch - Hosted by Raytheon**

HEL Lethality I (LIMITED)

Sheraton, Lanai Room

0600 **Registration at Sheraton Breakfast-Hosted by Northrop Grumman**

0800 **Simple Algorithms for HEL Lethality Evaluations**
William Laughlin, Physical Sciences Inc

0820 **Dynamic Aimpoint Laser Engagement (DALE)**
Robin Ritter, Tau Technologies

0840 **Imaging for Phased Array HEL Acquisition, Tracking and Pointing and Fire Control Systems**
Paul McManamon, Exciting Technologies

0900 **Implications of DARPA APPLE Phase Array Technologies for HEL Beam Steering and Fire Control**
Kevin Probst, The CORE Group

0940 **Break**

Solid State Lasers (LIMITED)

1000 **Enhanced Track Illuminator Laser for Airborne Laser**
Daniel Ripin, MIT Lincoln Lab

1020 **New Advances in Materials Technologies for DE Applications**
Vida Castillo, VLOC

1040 **Radiation Balanced Yb:YAG Amplifier**
Shawn O'Connor, Photonics Technology Branch

1100 **Development of a 500 W Output Yb: YAG Based Ultra-Short Pulse Laser System**
Jim Zhang, Applied Energetics

1120 **High-Average Power Amplifier for Ultra-Short Pulse Lasers**
John Vetrovec, Aqwest, LLC

1200 **Lunch - Hosted by Raytheon**

Concurrent Sessions by Room and Time

OPEN | LIMITED | SECRET

	Sheraton Kauai Room	Sheraton Lanai Room	Sheraton Honolulu Room	Sheraton Oahu Room	Offsite Location
Tuesday 1300	Technology to Transition (OPEN)			Student Session (OPEN)	HPM Systems and LIPC (SECRET)
Tuesday 1500	HEL Interaction and Diagnostics (OPEN)	DE Technology Programs (LIMITED)	FEL Components, Systems, and Novel Concepts (OPEN)	Student Session (OPEN)	HPM Sources, Protection, and Diagnostics (SECRET)
Wednesday 0800	Solid State Slab (OPEN)	HEL Lethality I (LIMITED)	FEL Injectors I (OPEN)		Threat/ Intelligence (SECRET)
Wednesday 1000	Optical Components (OPEN)	Solid State Lasers (LIMITED)	FEL Injectors II (OPEN)	Gas Lasers (LIMITED)	Military Utility/ Programs (SECRET)
Wednesday 1300	Beam Control I (OPEN)		Power and Thermal I (LIMITED)	HPM M&S (LIMITED)	Military Utility/ Programs II (SECRET)
Wednesday 1500	Power and Thermal II (OPEN)		Beam Control II (LIMITED)	FEL Components, Systems, & Novel Concepts II (LIMITED)	CIED Systems (SECRET)
Thursday 0800	Optical Systems and Propagation I (OPEN)	DE Military Utility (LIMITED)			HPM Effects Vehicle/Vessel (SECRET)
Thursday 1000	HPM Sources, Coupling, and Computational Tools (OPEN)	Incoherent Beam Combined Systems (LIMITED)		Offsite Location HPM Posters (SECRET)	HEL Effects (SECRET)
Thursday 1300	Fiber and Thin Disk Laser Systems (OPEN)	Optical Systems and Propagation II (LIMITED)			HPM Susceptibility (SECRET)
Thursday 1500	Fiber Laser Technology (OPEN)	HPM Technology and Systems (LIMITED)		Offsite Location HEL Posters (SECRET)	CIED Modeling/ Susceptibility (SECRET)
Friday 0800	FEL Theory and Simulation I (OPEN)	Novel DE Technologies (LIMITED)	Invited Talk (OPEN)		
Friday 1000	HPM Sources, Diagnostics, and Effects (OPEN)	FEL Theory and Simulation II (LIMITED)	DE Education Workshop (OPEN) Ends at 1700		

WEDNESDAY MORNING

Threat/Intelligence (SECRET)

Offsite Location

0600 **Registration at Sheraton Breakfast-Hosted by Northrop Grumman**

0640 **Buses to Offsite Location**

0700 **Worldwide Military Laser Incidents: A Threat Assessment**

0720 **Joint Directed Energy Effectiveness Program - Threat DE Vs Deployed Airbase**

0740 **Foreign Directed Energy Test Activities**

0800 **National Measurement and Signature Intelligence Management Office**

0820 **DE IADS in 2030**

0840 **Worldwide Laser Weapons Development**

0900 **2008 Update on Foreign Ground-Based Air Defense and Anti-Satellite Directed Energy**

0920 **Worldwide Radio-Frequency Weapons Development**

0940 **Break - Hosted by Raytheon**

Military Utility/Programs I (SECRET)

1000 **Update on the Tactical Employment of and Extensions to a High-Power Microwave Counter-Improvised-Explosive-Device System**

1020 **Laser Weapon System Augmentation "What it buys the Sailor?"**

1040 **Non-Kinetic Strike Capability**

1100 **Airborne Laser**

1120 **ATL Overview**

1140 **Military Worth Analysis of an Airborne HPM Counter-Electronics Platform**

1200 **Lunch - Hosted by Raytheon**

WEDNESDAY AFTERNOON

Beam Control I (OPEN)

Sheraton, Kauai Room

1300 **Development of an Error Signal for Use in Adaptive Algorithms for the Control of Platform Induced Jitter in Directed Energy Systems**
Joseph Watkins, US Naval Academy

1320 **Passive Control and Aero-Optical Measurements of Flow Over a Flat-Windowed Turret**
Jacob Cress, University of Notre Dame

1340 **Passive Shear Layer Regularization for Aero-Optics: A Progress Report**
Donald Wittich III, Notre Dame

1400 **High Efficiency Coherent Fiber Beam Combiner**
Michael Wickham, Northrop Grumman

1420 **Break - Hosted by Raytheon**

Power and Thermal II (OPEN)

1440 **Thermal Management System for Directed Energy Weapons**
John Vetrovec, Aqwest, LLC

1500 **Tactical Very High Power Density Programmable Power System for DEW Applications**
Gary Grider, DRS Technologies

1520 **Compact Power Conditioning for Directed Energy Sources**
Randy Curry, Univerisity of Missouri

1540 **Sensitivity and Trade off Analysis of Li-ion Power Source for Lasers**
Kamen Nechev, SAFT America

1600 **Power and Thermal Management Evaluations for a Laser Power System on a Tactical Aircraft Platform**
Mysore Ramalingam, Aerospace Power & Propulsion Technologies Division

1730 **Buses Depart for USS Missouri**

1800 **Evening Reception on USS Missouri Hosted by Northrop Grumman**

Power and Thermal I (LIMITED)

Sheraton, Honolulu Room

1300 **Power and Thermal Management Systems for Directed Energy Weapons**
Frank Gulczinski, Air Force Research Lab

1320 **Lightweight Compact 2.5 MW Power Generator for Airborne DEW Sytems**
Jay Vaidya, Electrodynamics Assoc

1340 **Advanced Thermal and Power Management for DE Weapons: An AFRL/RZPS Program Overview**
Levi Elston, Air Force Research Lab

1400 **Power and Thermal Systems for a Speed-of-Light Gunship**
Don Borger, Lockheed Martin

1420 **Power and Thermal Management for a High-Energy Solid State Laser on an Aircraft**
Patrick Saunders, Air Force Research Lab

1440 **Break - Hosted by Raytheon**

Beam Control II (LIMITED)

1500 **ABL 12-inch Fast Steering Mirrors**
Felix Morgan, Applied Technology Assoc.

1520 **A Review of a FPGA Based Large High Performance Fast Steering Mirror**
Dan Eckelkamp-Baker, ATA

1540 **Thermal Effects Modeling in High Average Power Beam Directors**
Joseph Penano, Naval Research Lab

1600 **0.7-1.7 um InGaAs Focal Plane Array Imagers for DE Applications**
David Dawes, Goodrich ISR Systems

1620 **Assessment of Track Algorithm Performance vs Tactical Targets in Clutter as a Function of SWIR Track Sensor and Atmospheric Path Characteristics**
Richard Bartell, AFIT

1640 **High Optical Power Demonstration of Liquid Crystal Spatial Light Modulator for Tactical HEL Wavefront Control**
Bruce Winker, Teledyne Scientific Co.

1730 **Buses Depart for USS Missouri**

1800 **Evening Reception on USS Missouri Hosted by Northrop Grumman**

WEDNESDAY AFTERNOON

HPM Modeling and Simulation (LIMITED)

Sheraton, Oahu Room

1300 **Numerical Model of Stacked Magnetron High Power Microwave Source**
Peter Mardahl, Air Force Research Lab

1320 **ICEPIC Simulations of COTS Magnetrons and HPM Sources**
John Keisling, Science Applications International Corp

1340 **Computational Research & Engineering Acquisition Tools & Environments for Antenna Design & Integration**
Keith Cartwright, Air Force Research Lab

1400 **MW-Class Multiple-Beam Inductive Output Tube Modeling and Design**
E. Wright, Beam Wave Research, Inc

1420 **Self-Consistent Modeling and Simulation Tools for Directed Energy Technologies**
Walter Sessions, Naval Surface Warfare Ctr

1440 **Break - Hosted by Raytheon**

FEL Components, Systems, and Novel Concepts II (LIMITED)

1500 **INP and MW-Class FEL Accelerator Component Development**
Alan Todd, Advanced Energy Systems

1520 **Plan and Outcome of the NCRF High Power Thermal Test**
D. Nguyen, Los Alamos National Lab

1540 **Quality Factor Measurements of Cage Cavities**
John Noonan, Argonne National Lab

1600 **Design and Fabrication of the RHIC Electron-Cooling Experiment High Beta Cavity and Cryomodule**
John Rathke, Advanced Energy Systems

1620 **Systems Studies of High-Power Free Elecron Lasers for Ship Defense**
Michael Phillips, Advanced Energy Systems

1640 **Viability of MgB2-Coated RF Cavities for FEL Applications**
Yehoshua Agassi, NSWC

1730 **Buses Depart for USS Missouri**

1800 **Evening Reception on USS Missouri Hosted by Northrop Grumman**

WEDNESDAY AFTERNOON

Military Utility/Programs II (SECRET)

Offsite Location

1240 **Buses to Offsite Location**

1300 **Maritime Laser Demonstration Program**

1320 **HPM and the Counter-IED Fight**

1340 **Free Electron Laser and Maritime Operation**

1400 **ELLA: Status and Plans**

1420 **HELLADS Demonstrator Laser Weapon System Overview**

1440 **Break - Hosted by Raytheon**

CIED Systems (SECRET)

1500 **Design & Deployment of a SVBIED Defeat System into a Combat Theater Of Operation**

1520 **Employment of Directed Energy on the Battlefield for IED Defeat**

1540 **Update on Deploying a Tactical Directed Energy System**

1600 **An Overview of Directed Energy C-IED Systems and their Capabilities and Limitations**

1620 **Warlock Dragon 2 System Development and Testing**

1640 **Warlock Dragon 2 System Thermal Management and Mechanical Design**

1730 **Evening Reception on USS Missouri Hosted by Northrop Grumman**

THURSDAY MORNING

Optical Systems and Propagation I (OPEN)

Sheraton, Kauai Room

0800 **Some Recent Results of Maritime Laser Propagation Measurements over 1.35 and 7.07 km: Analysis of Turbulence Parameters and Higher-Order Statistics of Fluctuations**
David O'Connor, NAWCWD

0820 **Active Turbulence Control for Direct Reduction of Laser Beam Aberrations**
Aaron Freeman, University of CA

0840 **Coherent Combining with Discrete Cylindrical Vector Beams**
Steven Kurti, Naval Air Warfare Center

0900 **Atmospheric Propagation of a Beam from a Bundle of Partially-Coherent Fiber Lasers of Good Beam Quality**
Fassil Ghebremichael, Lockheed Martin

0920 **Laser Beam Quality Conversions**
Sean Ross, Air Force Research Lab

0940 **Break**

HPM Sources, Coupling, and Computational Tools (OPEN)

1000 **Automating High Power Microwave Susceptibility Testing**
Paul Anderson, Booz Allen Hamilton

1020 **Laser Produced Air Plasmas for Directed Energy Applications**
Daniela Gordon, Naval Research Lab

1040 **Compact Solid State High Power Modulator for Magnetron Based Transmitter**
Richard Thomas, Army Research Lab

1100 **Frequency-Multiplying Gyrotrons for Non-lethal Weapons Applications**
G. Nusinovich, University of Maryland

1120 **Chaotic HPM Sources for Electromagnetic Effects Applications**
John Rodgers, University of Maryland

1200 **Lunch**

DE Military Utility (LIMITED)

Sheraton, Lanai Room

0800 **Airborne Directed Energy Weapon System - ADEWS**
Roy Whitney, Jefferson Lab

0820 **Comparison Between the Relative Effectiveness of DE and Conventional Weapons**
Michael Rozema, Boeing

0840 **Aerostat Relay Mirror Ship-Based Laser Capability Enhancement**
Kenneth Billman, Lockheed Martin

0900 **Alternative Exposure Policy for Radio Frequency Radiation**
John DeFrank, US Army

0920 **Directed Energy and Non Lethal Weapons Joint Munitions Effectiveness Manual Working Group Overview/Status**
John Tatum, Army Research Lab

0940 **Break**

Incoherent Beam Combined Systems (LIMITED)

1000 **Navy Laser Weapon System (LaWS) Development**
Robert Pawlak, Naval Surface Warfare Ctr

1020 **Navy Laser Weapon System (LaWS) Beam Director Hardware Design/Validation**
Chris Behre, Naval Surface Warfare Ctr

1040 **Evaluation of Commercial Telescope and Development of Alignment Diagnostic for HEL Beam Combining**
Jason Sames, Penn State University

1100 **Atmospheric Propagation of Incoherently Combined Fiber Lasers for Tectical DE and Power Beaming Applications**
Phillip Sprangle, Naval Research Lab

1120 **3-km Field Demonstration of Incoherent Beam Combining Using Fiber Layers**
Rich Fischer, Naval Research Lab

1140 **A Laser Weapon System Architecture Based on a Collection of High Beam Quality Fiber Lasers**
Detlev Tiszauer, Lockheed Martin

1200 **Lunch**

HPM Effects Vehicle/Vessel (SECRET)

Offsite Location

0700 **Buses to Offsite Location**

0800 **Investigation of a Non-Lethal Direct Charge Injection Pre-Emplaced Vehicle Stopping System**

0820 **Investigation of a Non-Lethal Multi-Frequency RF Vehicle Stopping System**

0840 **Effects Analysis of a Non-Lethal Multi-Frequency RF Vehicle Stopping System**

0900 **Non Domestic Outboard Engines Performance Under High Power Microwave Emissions**

0920 **Dynamic HPM Vessel**

0940 **Break**

HEL Effects (SECRET)

1000 **Representation of Target Vulnerability Criteria**

1020 **System Effectiveness Modeling of a Multiple Pulse Laser Countermeasure to Imaging Missiles**

1040 **Single Mode Multi-kW Fiber Laser Lethality Testing Against Missiles**

1100 **High Energy Ultra Short Pulsed Laser Testing for IRCM Applications**

1120 **Changes in the Reflectivity of Painted Surfaces Due to Laser Radiation**

1140 **Update on DARPA UPSL Propogation**

1200 **Lunch**

SECRET POSTER SESSIONS

THURSDAY MORNING

HPM Posters (SECRET)

Offsite Location

Millimeter Wave Effects: Behavioral Aversion as a Function of Spot Size

Active Denial System System 2 Test Results

Radio Frequency Weapons - The Myths and the Facts

An RF Fingerprint Used to Design Blasting Cap Surrogates

Conservation of Energy Investigation of Electro Explosive Devices (EEDs)

Susceptibility Evaluation of Industrial Control Systems to High Power, Wideband RF Sources

High Power Microwave Source Development for Directed Energy Systems

THURSDAY AFTERNOON

HEL Posters (SECRET)

Offsite Location

Detailed Assessment of Tactical Missile Vulnerability Using the LEWAT-EF Code Applied to the Compete TGM

ABL's Low Power Flight Tests Demonstrate HEL Weapon System Engagement Sequence

An Investigation of a Gas Laser Pressure Recovery System Diffuser

Overview of Recent Predictive Avoidance Methodology and Policy Updates

ABL BCFC Upgrades for HPSI

Airborne Laser Adjunct Mission Low Power Test Bed Data and LMWOC Simulation Results Comparison

THURSDAY AFTERNOON

Fiber and Thin Disk Laser Systems (OPEN)

Sheraton, Kauai Room

1300 **Thin Disk Solid State Laser Development High Efficiency, Supportable Lasers for Battlefield Operations**
Edward Pogue, Boeing

1320 **Recent Progress on High Power Fiber Lasers**
D. Gapontsev, IPG Photonics

1340 **A High-Power, Eye-Safer Fiber Laser Using Resonant Diode Pumping of Erbium**
Jason Langseth, Textron Defense Systems

1400 **Progress Towards 300W "All Fiber" Narrow Frequency, Single Mode, Polarized MOPA Fiber Laser**
Ray Horley, SPI Lasers UK Ltd

1420 **The TRUMPF Disk Laser**
Timothy Morris, TRUMPF, Inc.

1440 **Break**

Fiber Laser Technology (OPEN)

1500 **550-W, Single-Mode Tm Fiber Laser Amplifier**
Gregory Goodno, Northrop Grumman

1520 **Coherent Kilo-watt Level Monolithic PM Fiber Amplifiers**
John Edgecumbe, Nufern

1540 **High Power Fiber Laser Pump Sources**
Silke Pflueger, Laserline, Inc.

1600 **High Power Pulsed Tm-Doped Fiber Amplifier System with High Pulse Energy**
Daniel Creeden, BAE Systems

1620 **Resonantly Cladding-Pumped, Single-Frequency, LMA Er Fiber Amplifier**
Larry Merkle, Army Research Lab

1640 **Novel Uses for Multicore Fibers to High-Power Fiber Lasers and Sensors**
Erik Bochove, Air Force Research Lab

Optical Systems and Propagation II (LIMITED)

Sheraton, Lanai Room

1300 **Broad Spectrum Overland Surface Boundary Layer Optical Turbulence Assessments from Climatological Temperature, Pressure, Humidity, & Wind**
Steven Fiorino, Air Force Institute of Technology

1320 **Atmospheric Turbulence Compensation with Adaptive Optics: Demonstration Results for Tactical Laser Weapons**
Aaron Buckner, Northrop Grumman

1340 **Development of a Performance Model of Laser Weapon Systems Comprised of Multiple Tiled Solid State Laser Slab or Fiber Subapertures**
Richard Bartell, Air Force Institite of Technology

1400 **Precision Tracking and Aimpoint Maintenance of Maneuvering Targets in the Presence of Background Clutter**
Sadegh Siahatgar, NAVSEA

1420 **Beam Control for Aircraft Self-Defense**
Alan Ullman, Boeing

1440 **Break**

HPM Technology and Systems (LIMITED)

Sheraton, Lanai Room

1500 **A160 HPM Integration**
Keith Coleman, Boeing

1520 **Innovative and Efficient HPM Test and Evaluation Facility for Precision Guided Munitions, Fuses, Avionics, Unmanned Air Vehicles, and other DOD Electronic Systems**
Maqsood Mohammed, Jacobs Technology

1540 **Dielectric Wall Accelerator Technology for High Power Microwave Generation**
J. Harris, Lawrence Livermore National Lab

1600 **Reltron-Based High Power Microwave Threat Simulator Facility at White Sands Missile Range**
Carl Eichenberger, L3Com/USArmy

1620 **Explosive Driven High Power Microwave Demonstrator**
Larry Altgibers, USA SMDC

1640 **W-Band Frequency-Multiplying Gyrotron with Permanent Magnets**
John Pasour, Naval Research Lab

THURSDAY AFTERNOON

HPM Susceptibility (SECRET)

Offsite Location

1240 **Buses to Offsite Location**

1320 **Military Implications of the Tactical Employment of HPM Weapons: Support to NATO Field Operations**

1340 **Summary and Comparative Analysis of HPM Susceptibility Measurements of the NATO TALANFA System**

1400 **Impact of Current and Future High-Power Microwave Weapons on Surface U.S. Naval Radar Systems**

1420 **Susceptibility Evaluation of Maritime Systems to High Power Microwave Sources**

1440 **Break**

CIED Modeling/Susceptibilityy (SECRET)

1500 **Modeling of HPM Dose and Tissue Heating for MAX Power**

1520 **Modeling HPM Coupling to IEDs**

1540 **Characterization of Electro Explosive Devices (EEDs) Through 3-D Finite Element Analysis**

1600 **Susceptibility of Electro-optic COTS Devices to HPM**

1620 **Development of an RF System Evaluation Tool for Directed Energy Applications**

1640 **Material Interactions and Effects on CIED Surrogates**

1700 **Understanding the Susceptibility of PIRs Used In Explosive Threats**

FRIDAY MORNING

Invited Talk (OPEN)

Sheraton, Honolulu Room

0800 **FM Basics for R&D Program Managers**
Terry Franks, Air Force Research Lab

A stroll through the life of R&D funding from Congress to the Program Manager ... authorization to outlay. Fiscal Law condensed to the principles of Time-Purpose-Amount and how to avoid the dreaded Anti-Deficiency Act (ADA).

FRIDAY MORNING

FEL Theory and Simulation I (OPEN)

Sheraton, Kauai Room

0800 **High Fidelity Modeling of High-Brightness Electron Beams for Free-Electron Laser Applications**
Phillipe Piot, Northern Illinois University

0820 **Electron Beam Halo: Origin, Detection and Mitigation**
R. Kishek, University of Maryland

0840 **Characteristics and Capabilities for the GINGER FEL Simulation Code**
William Fawley, Lawrence Berkeley National Lab

0900 **Generation, Amplification and Guiding of Coherent Optical Modes with Orbital Angular Momentum in a FEL**
Erik Hemsing, UCLA

0920 **Enhanced Wall-Plug Efficiency in FEL Amplifiers Employing Energy Recover Linacs**
Phillip Sprangle, Naval Research Lab

0940 **Break**

HPM Sources, Diagnostics, and Effects (OPEN)

1000 **High Power Microwave Wideband Threat System**
Cyndi Mora, SAIC

1020 **Basic Studies of HPM Effects in Mixed-Signal Electronic Systems**
John Rodgers, University of Maryland

1040 **HPM System and Subsystem Simulation of FOI**
Sten Nyholm, Grindsjön Research Centre

1100 **A Scanning Target Board for Real-Time, Wide-Area Measurement of High-Power Millimeter-Wave Beams**
Michael Zintl, Scientific Applications & Research Assoc.

1120 **Diagnostic Array for Characterizing Narrow Band HPM Sources**
Dale Coleman, Sandia National Lab

1200 **Symposium Adjourns**

FRIDAY MORNING

Novel DE Technologies (LIMITED)

Sheraton, Lanai Room

0800 **Compact, Scalable, High-Power THz Sources**
H. Bluem, Advanced Energy Systems

0820 **All Cryogenic Lasers**
Jason Brasseur, Directed Energy Solutions

0840 **Directed Energy for Stand-off Active-Interrogation: Detection of Terrorist Nukes in a Maritime Context**
P. Turchi, Los Alamos National Lab

0900 **Compact Solid State Tunable THz Source for Threat Reduction Applications**
Nathan Moody, Los Alamos National Lab

0920 **Class-E UHF Power Amplifier Development**
Michael Smith, Naval Surface Warfare Center

0940 **Break**

FEL Theory and Simulation II (LIMITED)

1000 **Optical Beam Quality In Free-Electron Lasers**
Phillip Sprangle, Naval Research Lab

1020 **Non-Conventional Tapering for Enhanced Optical Efficiency in MW-Class FEL Amplifiers**
Joseph Penano, Naval Research Lab

1040 **Start-to-End Analysis of High Power Free Electron Laser Amplifiers**
Sean Niles, Naval Postgraduate School

1100 **Free Electron Laser Performance with Quadrupole Magnet Misalignment from Shipboard Vibrations**
John Lewellen, Naval Postgraduate School

1120 **Self-Amplified MW-Class FEL**
Bahman Hafizi, Naval Research Lab

1140 **The Effect of Shot-Noise on the Start-Up of the Fundamental & Harmonics in FELs**
Henry Freund, Science Applications International Corp

1200 **Symposium Adjourns**

FRIDAY

DE Education Workshop (OPEN)

Sheraton, Honolulu Room

1000 **HEL JTO Educational Outreach**
Don Seeley, HEL JTO

1015 **DEPS Educational Programs**
Sam Blankenship, DEPS

1025 **2008 AFIT DE Summer Intern Program**
Marken Houle, AFIT/ENP, Brandon *McClung and Phillip Grice*, AFIT Interns

1125 **Air Force HEL Center of Excellence**
John Gaudet, University of New Mexico

1140 **The Georgia Tech Lidar Education Program**
Leanne West and Gary Gimmestad, GTRI

1205 **Lunch**

1235 **Aero-Optics Research at the University of Notre Dame and Passive Shear Layer Regularization for Aero-Optics**
DJ Wittich, Notre Dame-Graduate DE Scholar

1300 **Research Experiences for College Students: What Works, and Lessons for the Classroom**
Lisa Hunter, UC Santa Cruz and UH

1325 **Maui Community College Program**
Mark Hoffman, Maui Community College

1350 **Photonics and STEM Education on Kauai**
Francis Takahashi, Kauai Community College

1415 **Huntsville City Schools Program**
Angela Traylor and Eugene Edwards, Huntsville City Schools

1440 **Break**

1500 **Laser Induced Breakdown Spectroscopy of Surrogate Explosives**
Leebyn Chong, NRL Intern

1525 **Analysis of Multiple Laser Beam Wander in a 2-mile Propagation Experiment**
Amanda Fried, NRL Intern

1550 **Filament Measurements in Underwater Laser Propagation**
Julie Haney, NRL Intern

1615 **Millimeter-Wave Solid-State Reactive Sintering of Nd:YAG Ceramic Laser Host Materials**
Chad Stevenson, NRL Intern

Symposium Organizing Committee

CAPT David Kiel, US Navy, Chair of the Symposium

Dr. Garret Polhamus, AFRL, Co-Chair of the Symposium

Program Committee

Dr. Brian Hankla, Technical Chair

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Dr. Frank Peterkin

Mr. Mike Richardson

Dr. Walter Sessions

Dr. Phillip Sprangle

Ms. Carol Sullivan

Symposium Coordinator

Cynnamon Spain

Registration and Short Courses

Donna Storment

Directed Energy Professional Society
2600 Yale Blvd SE, Suite 139
Albuquerque, NM 87106
Tel: 505-998-4910
Fax: 505-998-4917

www.deps.org